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THE PROBABLE EFFECT OF THE CLIMATE OF THE RUSSIAN FAR EAST ON HUMAN LIFE AND ACTIVITY

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If, as in the Arabian fairy-tales, it were possible to bring the past before our eyes again so that we could follow the first steps of human civilization, then we could, without doubt, see how great has been the influence of geographical conditions. We should see how nature determined the first and most difficult steps of humanity, sometimes giving human beings numerous opportunities and opening wide and easy paths to progress, and again without pity keeping whole nations during long, long centuries without the least ray of light.

From the material on hand, which has been gathered by students of geography, ethnography, history, and other branches of science, we must conclude that all of mankind's customs and inclinations, its physical characteristics, and the anthropological types of various nationalities, as well as the very germs of its religious beliefs, are due first of all, and above all, not to some unseen, supreme power, but to the law-abiding forces of nature. If we could sum up all the present knowledge about nature, it would be possible to conclude without hesitation that the surrounding nature has always had a deep and irresistible influence on all the branches of the vegetable and animal kingdom, as well as on the physical and spiritual nature of man. Geography recounts the history of geographical conditions, and among them the chief place of importance belongs to the climate. On it depends the material as well as the spiritual organization of governments, and on it is based all their future.

Explorers in Siberia have constantly noted the influence of the climate on its life. Of these observations, the most notable are those of the famous Russian scientist, Prof. A. Midendorff. In his work, "Travels to Northern and Southern Siberia," Part I (St. Petersburg, 1860), which constitutes an epoch-making event in the study of Siberia, he says: "Nowhere in all the world does the climate act in such an unfriendly manner toward vegetable and animal life, not excluding man, as it does in Siberia. Nowhere but there

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is the character of the country preconditioned to such minute details by the climate, and nowhere is the triumph of life over the enmity of the outside world so complete as in Siberia." The very distinguished and not less famous scientist, G. N. Potanin,¹ also says: "The chief factor is nature, which preconditions the physiognomy of a country and its landscape, the fauna, and even the civilization of man. The peculiarities of the Siberian climate will, without fail, affect the art of the country likewise, if art ever appears on Siberian soil. In painting, one may suppose that Siberia will produce good colorists. And in music, also, the influence of nature will undoubtedly be powerful." This opinion, more optimistic than Midendorff's, is at best true only of western Siberia, rather than of the Russian Far East. In general, we may say that the chief error of many Russian as well as foreign scientists lies in the fact that they draw their conclusions for all Siberia as a whole, whereas it possesses many marked differences and peculiarities. It is as impossible to characterize the climate of Siberia as a whole as it would be to characterize the climate of the United States or Europe.

Many articles, pamphlets, and even books have been written about the climate of Siberia and that of various sections of Siberia, but no one has undertaken to draw the parallel between the climatic and the cultural peculiarities of this part of the Asiatic continent. Nor is there such a work for the Russian Far East, which, generally speaking, has been studied very little. It is astonishing to see how the climate of the Russian Far East has been neglected by scientists as well as by the government. Here are two very characteristic examples. In 1891 the Amur region was visited by the well-known Russian scientist and botanist, Prof. S. Korginsky, with the special intention of acquainting himself with the condition of agriculture. As the result of his investigations, there appeared in the Bulletin of the Eastern Siberian Branch of the Russian Geographical Society for 1892 a very interesting account of his expedition. But among many valuable and interesting facts which he brought out no space was devoted to the climate. The administration, as well as the scientist, had almost entirely forgotten this very important factor. Another explorer, toward the end of the nineties of the last century, while studying Sakhalin, asked a very responsible member of the administration about the climate of Sakhalin and received the following reply: "The climate of Sakhalin? Well, this is such a dirty place that it has no climate."

It would be incorrect to conclude from these instances that the Russian Far East has been entirely untouched by investigations. In a number of works sufficient respect is paid to the climate of this territory. First among them should be mentioned the works of such men as Professor Woeikov, Dr. N. Kirilov, Prof. K. Bogdanovich, Doctor Slunin, Professor Schmidt, Professor Komarov, Mr. F. Schperk, and Mr. Yuvachev. But all the works of all these men were only first attempts, and they fall far short of giving a

¹ Potanin, G. N. *Nudzhi Siberin (Needs of Siberia)* p. 265, St. Petersburg, 1908.

complete picture of this exceedingly interesting part of Russian Asia. We shall try, in this article, to draw a parallel between the conditions of the climate and the living conditions of the population.

We shall begin our analysis on the most important basis of all—the economic basis. In studying the climate of the Russian Far East, one notices without difficulty that, thanks to local peculiarities, the country is subdivided into several regions.¹ In our work we have distinguished the following several regions: (1) Chukotsk-Anadyr, (2) Kamchatka, (3) Okhotsk, (4) Sakhalin, (5) Nikolaevsk, (6) Ussuri, (7) Amur. These are subdivided into still smaller sub-regions. We may characterize briefly all of these regions according to their chief economic features in the following table:

TABLE I. *Regions of the Russian Far East and their economic features*

Region	Possible extent of agriculture	Principal branches of present economic life	Other branches of economic life capable of development in near future
Chukotsk-Anadyr ..	Impossible	Hunting, fisheries, reindeer-breeding	Mining
Kamchatka.....	Almost impossible	Hunting, fisheries	Forestry, animal-breeding, vegetable-raising
Okhotsk.....	Impossible	Hunting	Animal and reindeer-breeding to a certain extent, vegetable-raising
Nikolaevsk.....	Possible to a certain extent	Fisheries	Animal-breeding, agriculture, mining
Sakhalin.....	Possible to a limited extent	Fisheries, agriculture, mining	Forestry, agriculture to a limited extent
Ussuri.....	Possible to a wide extent	Agriculture, fisheries, mining, forestry	Manufacturing
Amur.....	Possible to a wide extent	Agriculture, hunting, fisheries, mining, forestry	Manufacturing

Even from this brief table one can see clearly that the economic regions depend definitely upon the climatic conditions. The greatest attention, certainly, should be given to agriculture, as it is the basis of the nation's welfare and progress. It would be very interesting and important in this respect to establish the limits within which agriculture flourishes, or, in other words, the

¹ These regions have been described by the writer in "Climatic Provinces of the Russian Far East in Relation to Human Activities," *Geographical Review*, Vol. 12, No. 1, pp. 100-115, 1922.

limits within which barley is raised, as that is the grain which is grown farthest north. The well-known meteorologist, Wild, found, for example, that the northern limit of barley culture coincides with the isotherm 5° C. in May. But this restricts the limits too much and is not justified by the facts. Prof. A. Midendorff, in establishing the northern limit of barley culture according to historical and economical evidences, in the area between the rivers Obi and Lena, gave it as $61-62^{\circ}$ N. latitude, and added that the Okhotsk mountain range brings it farther south, extending it into the Amur Province. But in the present state of our knowledge of Siberia such a limit can not be established. In any case, however, whether the limit extends farther north or farther south, the main determining cause will always be the climate. And finally it may be concluded unmistakably that the climatic peculiarities, such as the temperature, humidity, winds, fogs, etc., of the Okhotsk, Kamchatka, and Chukotsk-Anadyr regions, exclude all possibility of the development of agriculture in these regions. Consequently this vast part of the Russian Far East is entirely useless for agricultural colonization, and the population may be increased, therefore, only by the development of other industries, chiefly fisheries. In other regions, however, particularly Ussuri and Amur, where the climate has an entirely different aspect and possesses milder and more favorable features, agriculture exists and in the future may reach a considerable degree of development. Even here, though, we find that not all the parts of these regions are favorable for agriculture, and this difference is due not so much to the various kinds of soils as to the climatic peculiarities.

Here we must repeat and emphasize especially the fact that many unfavorable features which appear as a result of the climate may in the future be avoided. Agriculture, so to speak, is the arena wherein man struggles with nature, overcoming its inertia, its avarice, its defects, and its obstacles. Thus, struggling and overcoming, the agriculturist tries with the given natural conditions to increase and broaden the productivity of the land. By such a struggle the future population of the Russian Far East will be able to avoid many of the unfavorable conditions caused by the climate. In 1899, for example, the Ussuri Railroad was finished. Before the laying of this line the region between the rivers Ussuri and Lefu was rendered so swampy by the humid climate during the period of the summer rains that there was no communication whatever. As a result of the laying of the railroad, this vast area with its splendid fertile soil, which had before been desolate and almost unpopulated, has changed character entirely. Flocks of cattle and cultivated fields of grain appeared soon after the railroad came; there were thousands of haystacks to be seen, and the population became denser. Village after village sprang up in places where before there were only swamps and forests. Communication became easier, and gradually the obstacles which were created by the climate were removed.

Fish takes the place of bread in the Russian Far East. Consequently,

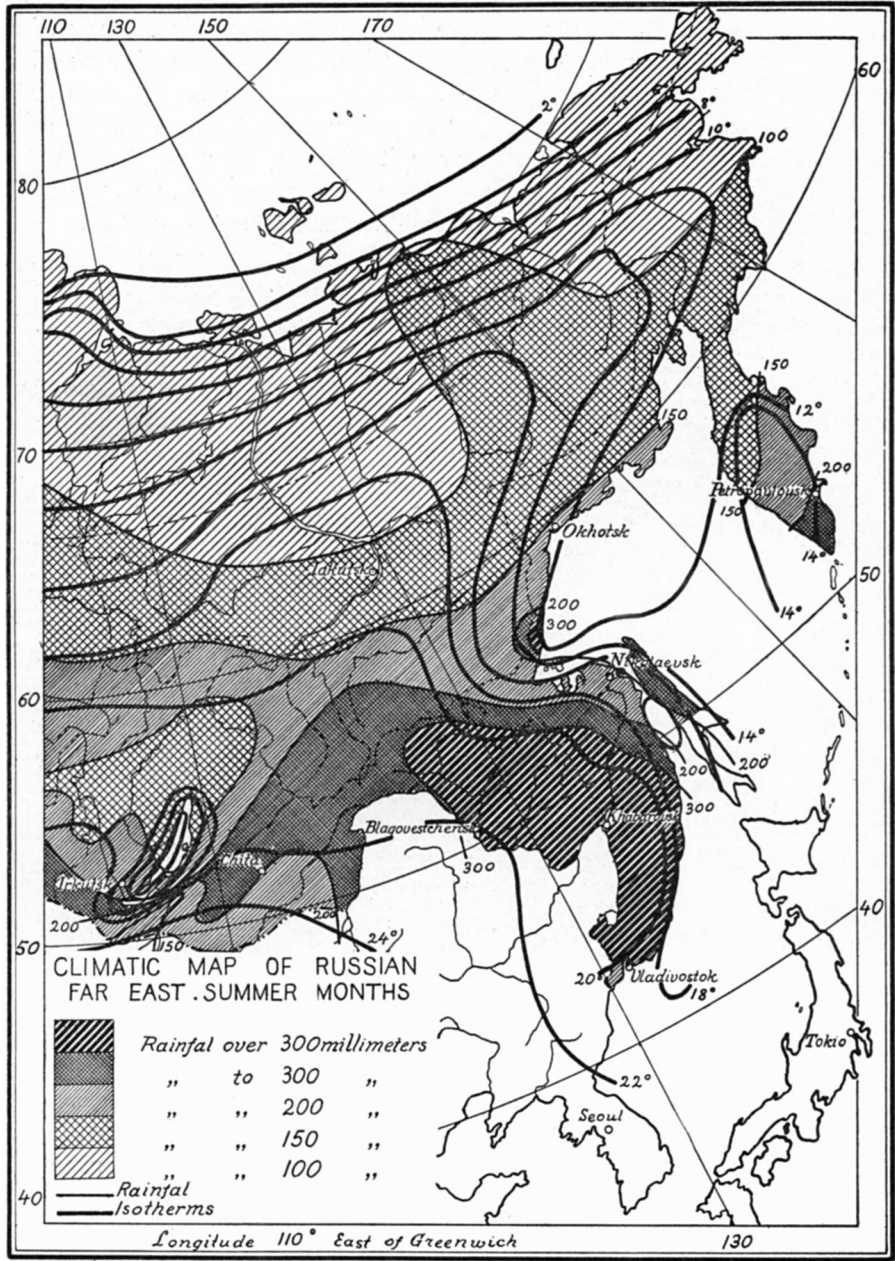


FIG. 1. Summer temperature and precipitation of the Russian Far East.

fishing plays a very important part among the activities of the population, and in some sections it is the chief occupation. A scarcity of fish is of as great importance in the northeastern parts of the Russian Far East as a bad harvest of grain is in other sections. A fish famine brings the same sorrowful and disastrous consequences as a bread famine in Europe. The climate plays as important a part in the fish industry as it does in agriculture, being either a benefactor or a merciless enemy. The most serious climatic element in this respect appears to be the dampness and the large number of cloudy days. The lack of salt, the primitive methods of salting and preparing the fish, compel the fishers in almost all of the northeastern part of the Russian Far East, namely, the Okhotsk, Kamchatka, and Chukotsk-Anadyr regions, to dry the fish by the natural heat of the sun. As the drying of the fish takes place chiefly in the second half of July and August, the number of rainy and cloudy days during that period is of great significance. While the fog in some places, as in London, for instance, deprives many people of pleasure and perhaps has some slight effect on the stock exchange and the retail trade, in far northeastern Siberia it means life or death for many hundreds of people, and may bring about fatal consequences to the entire country. The following table contains the number of cloudy and rainy days for the fishing season in the chief fishing localities:

TABLE II. *Cloudy and rainy days of summer in the chief fishing localities*

Station	Cloudy and partly cloudy days				Rainy days			
	June	July	Aug.	Total	June	July	Aug.	Total
Okhotsk.	23	28	31	82	21	24	13	58
Petropavlovsk.	19	28	30	77	15	27	27	69
Nikolaevsk.	29	29	26	84	5	9	12	26
Nikolskoye.	21	24	21	66	3	7	3	13
Nayakhan.	30	24	21	75	11	19	15	43

In other words, in all this part of the Russian Far East, where the fish supply is so important, the largest part of the summer is characterized by cloudy days, which are very unfavorable for the preparation of fish. But nature, as if compensating for its severity, sends cold weather early, and thus provides the primitive method of freezing to prepare or to complete the preparation of the fish, which is consumed in this region not only by man, but also by his faithful companions, the team dogs. There are other factors which also considerably injure the fishing industry and serve as very influential climatic obstacles in this branch of the national activity. These include the long winter period; the freezing of the harbors, the shores, and the estuaries of the rivers, and the lateness of the period when they are freed

from ice in the spring; the autumn cold spells; the heavy fogs of the spring and autumn; and the strong winds.

The climate is not less influential in the matter of cattle and stock breeding. The chief and almost the sole occupation of the country of the Chukchi, commonly called Reindeer Chukchi, is reindeer breeding, which proves so profitable that the people do not take time to hunt or to fish. Consequently, for part of the population of the Russian Far East, this occupation plays the predominating rôle. The reindeer provides food, clothing, and the means of communication, and is therefore the main supporter of life. But even the reindeer, which might seem to be able to stand all the mischief of the climate of the extreme north, nevertheless suffers from it at times. The severe and snowy winters affect the reindeer very injuriously, because the moss tundras become hidden under the snow, which makes it difficult to secure food. In the summer the reindeer have plenty of food, but if the summer is especially hot, they suffer from the gad-fly, the abundant growth of which is favored by the tundra. Many of the diseases of the reindeer, too, are found to be in close connection with the climate. A general murrain among the reindeer, or a poor catch of fish, or a spoilage of the fish, will cause many of the aboriginal tribes of the Russian Far East distress which can not be imagined. Finally, the dogs which are so important in the life of the extreme north frequently perish from the fish famine or from the contagious diseases, which, although their cause is not exactly known, seem to be connected with the climatic conditions of the country.

Cattle breeding is also greatly affected by the climate. The low state of its development in the Amur Province at present is due to the following peculiarities: the heavy summer rains; the lack of nourishing herbs, caused by the excessive moisture and lack of sunshine; the lack of good pastures; and the abundance of noxious insects. In the future, with the development of agriculture and the increase in the planting of root crops, there will probably be a considerable increase in cattle breeding, and many of the unfavorable influences of the climate will be overcome.

In the Maritime Province the climate is milder, the vegetation more abundant, and the pasture period longer. The winter, however, is long and cold; but there is good mowing, and in general there are better climatic conditions for the development of cattle breeding. Furthermore, noxious insects are absent from this section, thanks to the oceanic winds, which drive them inland. In the rest of the region, although cattle breeding is possible, the climate is so severe as to hinder its development. This is true also of the Okhotsk and Kamchatka regions.

Hunting also constitutes a very important occupation in the Russian Far East, as well as in Siberia. Many of the aboriginals as well as the Russians pursue it daily. The climate influences hunting, as well as the other occupations, directly and indirectly. The indirect influence is due to the fact that

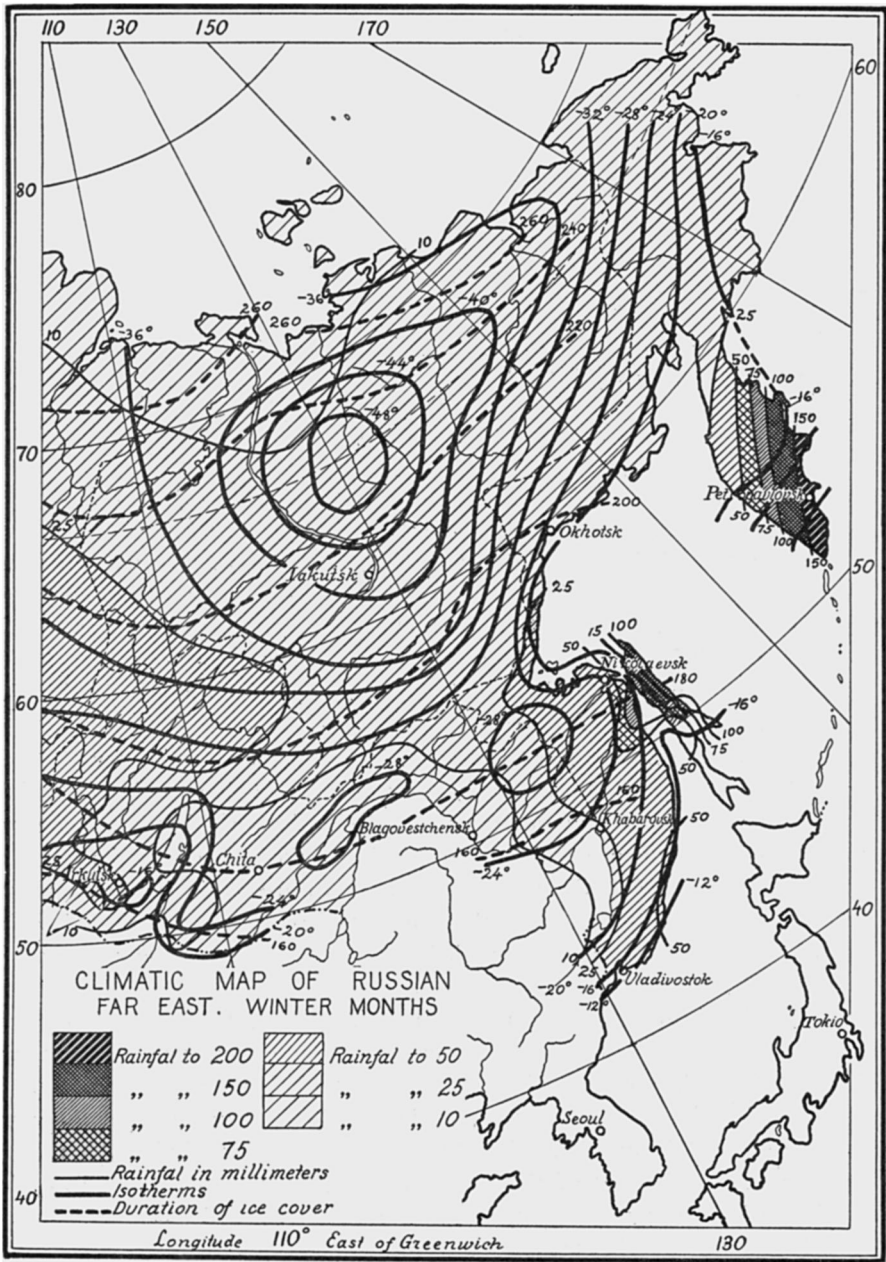


FIG. 2. Winter temperature and precipitation of the Russian Far East.

the climate, as was shown previously, determines the character of the forests and their limits of spreading, preconditions an abundance or lack of food for many animals, and determines also the very character of the forest animals. The direct influence shows itself in the species of the animals as well as in the nature of their fur, which is the greatest attraction and the chief object of the hunting. Besides the more or less severe winter, the lack or the abundance of snow, the formation of the crust of ice, the sleet, the thawing, the distribution of the rainy days, the storms, etc., all affect the migration of the animals, as well as the course of the hunting. Thus the climate either favors the hunter or deprives him of his chief support. The sleet and the icy crust which frequently destroy many animals are particularly unfavorable.

We have seen by this time that all of the chief branches of the economic life are in close dependence on the climate. Although its influence is felt by the settlers as well as by the native population, it is more powerfully exerted on the aborigines, who remain in a very low state of civilization. They are mere playthings in the hands of nature and are helpless to struggle with its surprises.

Let us turn now to the general question of population and its density. The statistical data for the conditions in the Russian Far East are as follows:

TABLE III. *Population of the Russian Far East and its density*

<i>Kamchatka Province</i>		
Districts	Total	Population per verst (0.66 sq. mi.)
Petropavlovsk	11,900	0.04
Anadyr	11,000	0.02
Ghizhighinsk	8,500	0.05
Commandore	1,700	1.1
Okhotsk	5,500	0.03
Chukotsk	1,900	0.04
Total	40,500	0.21
<i>Maritime Province</i>		
Districts	Total	Population per verst (0.66 sq. mi.)
Khabarovsk	99,000	0.4
Yman	124,300	2.4
Nikolsk-Ussuriisk	195,800	2.9
Olginsk	49,800	1.0
Ussuriisk Cossacs	137,700	1.6
Total	606,600	1.7
Amur Province	250,400	0.7
Sakhalin Province	33,500	0.3
Total Russian Far East	931,000	0.9

It will be noticed that these statistics have been given according to political divisions, which agree only in part with our climatic divisions.

The total population of the Russian Far East, therefore, amounts to only 931,000 souls. The density is very small. For the sake of comparison, let us say that the density of the population of European Russia is 28 persons per square verst; the density for all Russia is 8.7; the density for Siberia, 0.8; and in the Russian Far East it is only 0.9. In the territory now under discussion, as may be seen from Table III, the densest population is found in the south of the Maritime Province, the Zeya-Bureya plain. Such a distribution of population is in complete accordance with the conditions of climate. Moreover, this region offers the most favorable conditions for agricultural activities.

The races which make up the population vary widely among themselves, as will be made clear in the following table:

TABLE IV. *Population by races*

Race	Amur, percent	Maritime, Kamchatka, and Sakhalin, percent
Russians	86.8	52.6
Turco-Tatars	8.2	1.4
Poles	1.0	1.9
Finns	1.0	0.3
Jews	0.9	0.7
Lithuanians	0.3	0.2
Germans	0.2	0.4
Mountaineers (Caucasians)	0.1	0.1
Armenians	—	0.1
Mongolians	—	23.0
Miscellaneous	1.5	19.3

The aborigines of the territory consist of many tribes, which are very unevenly distributed. These people predominate in the northern parts, while in the southern sections their percentage is insignificant. The extreme northern district, that of Anadyr, and the extreme southern, Ussuri, are widely different in this respect. While in the former these tribes constitute about all of the population, 88.4 percent, in the latter they are almost entirely absent, the percentage being only 0.4 percent.

The aborigines of the Maritime Province and Kamchatka are composed of the following racial groups:

Palaeasiatics	25,401
Tungus	18,649
Yakuts	466
Mongolians	164
Total	<u>44,680</u>

By the name Palaeasiatics should be understood several ancient aboriginal tribes inhabiting the northeastern and some of the remote eastern districts of the Russian Far East. In their physical type and language, as well as in

their customs, they stand quite alone among all the aborigines of Siberia. The tribes with their numerical strength may be indicated as in the following table, the data being those of the year 1903:

Tribe	Men	Women	Total
Aleuts.....	287	284	571
Ainus.....	7	7	14
Gilyaks.....	1,420	1,225	2,645
Kamchadals.....	1,316	1,291	2,607
Koryaks.....	3,830	3,701	7,531
Chukchis.....	5,061	5,154	10,215
Eskimos.....	631	676	1,307
Yukagirs.....	42	48	90
Chuvantsi.....	222	199	421
Total.....	12,816	12,585	25,401

The Aleuts are found only on the Commodore Islands; the Gilyaks in the Uda district; the Chuvantsi, Yukagirs, and Eskimos in the Anadyr region; the Kamchadals in Kamchatka; the Chukchis in the Anadyr region and the Ghizhiga district. The Koryaks are scattered in different parts of the Okhotsk, Kamckatsk, and Anadyr districts. With the exception of the Chukchis, none of the above-mentioned tribes is increasing in number; in fact, some of them are gradually disappearing. The Kamchadals, Yukagirs, and Chuvantsi are nearly all Russianized; the Aleuts have partly adopted Russian customs; the Gilyaks, Chukchis, Eskimos, and wandering Koryaks have best preserved their national peculiarities. The Tungus tribes of Kamchatka and the Maritime Province consist of the following:

Tribe	Men	Women	Total
Goldi.....	2,638	2,376	5,014
Oroches.....	1,329	1,078	2,407
Neghidaliens.....	232	191	423
Samagirs.....	210	215	425
Manchurians.....	21	1	22
Soloni.....	7	8	15
Olchi.....	700	795	1,495
Tungus and Lamuts.....	4,544	4,304	8,848
Total.....	9,681	8,968	18,649

Some of the Tungus tribes have a half-settled mode of life and some are nomads. Each tribe, however, has its own region. Thus the Tungus tribes are scattered in small numbers in the Amur region, particularly along the Amur River and its tributaries, and in the unreachd and unexplored northern and eastern parts.

Besides the natives and the Russian immigrants, the population of the Russian Far East is composed of Koreans, Chinese, and Japanese, who are present in great numbers.

The Russian part of the population of the eastern borderland is composed exclusively of immigrants at present. The first attempts to populate the Amur and Maritime provinces were made in 1858. At first, however, as a result of the long distances, lack of railroads, and slackness on the part of the government in taking steps toward furthering colonization, these attempts met with little success, and up to 1883 only 9,000 people had arrived. Practically speaking, the colonization of the country did not begin until the eighties, when the government changed its views on the colonization question radically and took steps to encourage immigration. Systematic help was organized to aid the immigrants in settling the country. The development in immigration during a period of fifteen years is shown by half decades in the following table:

	1896-1900	1901-1905	1905-1910	1896-1910
Amur Province.....	14,755	12,841	67,739	95,333
Maritime.....	6,476	16,081	133,561	156,118
Total.....	21,231	28,922	201,300	251,453

The following figures show the average yearly immigration for the period from 1909-1913 in each of the provinces:

	Men	Women	Total
Amur Province.....	11,772	3,306	15,028
Maritime Province.....	11,423	3,748	15,171
Sakhalin.....	4	0	4
Kamchatka.....	2	3	5
Total.....	23,151	7,057	30,208

In 1914 the migration movement to the East increased so much that, in spite of the war, the total number of peasants who migrated from European Russia to the land beyond the Ural Mountains reached 336,409, which was 8,979 more than in 1913.

Immigrants to the Russian Far East are contributed mostly by the Ukraine, which contains the provinces of Poltava, Volynia, and Podolia. From the data of the Russian Statistical Committee it can be deduced that in the Amur Province, Ukrainians constitute about 40 percent of the white population, and in the Maritime Province the proportion is still higher.

The high percentage of emigrants from the southwestern provinces leads to the following very interesting fact, which is connected with the climatic conditions of the Russian Far East. In spite of the fact that up to the Russian Revolution in 1917 the Russian Far East was being more and more

occupied by settlers, there was observable at the same time a reversal of the current of migration, namely, a movement back to the native provinces of European Russia. The unsuitable natural conditions were probably the chief cause of this. According to the estimates of the author's colleague in the University of Kiev, Professor T. Yamzin, 45.4 percent of the settlers from the Maritime Province and 39.5 percent from the Amur Province returned home for these reasons. If we should consider indirect causes and influences, the percentage would be considerably increased. Among the natural conditions the climate occupied the first place. The reason for this is the character of the climate of the localities from which the settlers came. The peasant coming from the southwestern provinces of European Russia to the Russian Far East and finding an entirely different course of climate, after a short struggle with the new conditions, gives up everything, takes his possessions, and returns to his sunny home.

Among the population of the Far East, as in the case of the inhabitants of European Russia, a large percentage is occupied with farming. The last census, 1897, shows that in the Amur district 67,956 persons of both sexes were engaged in agriculture. This constitutes 56.5 percent of the population, which is divided according to nationalities in the following manner:

	Population	Agriculturists	Percentage
Great Russians.....	82,373	41,514	50.4
Ukrainians.....	21,096	18,508	87.7
Tungus.....	1,350	350	26.3
Manchurians.....	3,344	2,202	65.9
Chinese.....	7,816	3,695	47.3
Koreans.....	1,552	1,243	80.1

In the Maritime and Kamchatka provinces the agricultural population is distributed by districts as follows:

	Population	Agriculturists	Percentage
Khabarovsk.....	27,288	1,082	4.0
Ghizhghinsk.....	7,492	5	0.1
Anadyr.....	12,084		0.0
Commandore.....	651		0.0
Okhotsk.....	4,732		0.0
Petropavlovsk.....	8,365		0.0
Udsk.....	18,232	1,366	7.5
South Ussuri.....	124,830	61,027	48.9
North Ussuri.....	19,662	9,645	49.1

From this table it can be seen that almost the entire agricultural population is centered in that region which is called Ussuri. As to the nationalities which participate in agricultural pursuits in the two districts, the following data can be given:

	Total	Farmers	Percentage of farmers
Great Russians.....	80,178	19,359	24.1
Ukrainians.....	33,326	28,359	85.4
Poles.....	3,198	60	1.9
Hebrews.....	1,571	9	0.6
Tatars.....	1,034	24	2.0
Tungus.....	16,967	1,191	7.0
Chukchi.....	10,237		0.0
Koryaks.....	6,058	4	0.1
Kamchadals.....	3,978		0.0
Eskimos.....	1,099		0.0
Gilyaks.....	4,213	8	0.2
Chinese.....	30,904	3,992	12.9
Coreans.....	24,306	19,834	81.6
Japanese.....	2,094	33	1.6

It follows that the Russian population is chiefly occupied with agriculture and the aboriginal population with hunting, fishing, and the breeding of the reindeer. Moreover, while the Russian population is all settled, most of the aboriginals lead a nomadic kind of life. This condition is accounted for by the fact that some aboriginal tribes, at first under the pressure of the Mongol tribes, and later of the Russian newcomers, were obliged to move constantly to the places where the newcomers would trouble them the least. In these places the climate was not suited to agriculture, and they were obliged to choose either fishing or hunting, or, as a last resort, reindeer breeding. The Chukchi and Koryaks pass the winter in the interior of the country, where their reindeer find more food, and in the summer they move to the sea-shores, where noxious insects do not trouble the animals.

Some of the aboriginal tribes populating the Russian Far East have been partly assimilated, others are rapidly disappearing, while still others succeed in preserving their native customs and even increasing their numbers. The cause for this should be sought in the economic conditions, moral and political. Not being able to adapt themselves to the conditions which have been created by the incoming elements, the aboriginals suffer greatly, and with each year they decrease in number. As examples, we may cite the Chuvantsi and the Yukagirs. The only tribe which is increasing is the Chukchi. They have also preserved the best of their primitive peculiarities. This condition is undoubtedly closely connected with the climate. At first glance this will seem paradoxical, as nowhere is the climate so severe as in the territory inhabited by the Chukchi. It was the law of self-preservation, rather than desperation, which drove them to settle in this unfavorable corner. Coming here under the influence of some unknown historical cause, probably to escape oppression by some other people, they created for themselves by the severe climate a fortress inaccessible to communication and conquest, more stable than the primitive arrows or ditches, and stronger than the bullets of the modern gun. For a very long time the Chukchi were unconquerable. And even the present

representatives of the Chukchi, although they are considered to belong to the Russian domain, remain in fact absolutely independent, on account of their inaccessibility. Japan owes to the mildness of her climate the energy of her population, and to her island location is due her independence; but to an even greater degree do the Chukchi owe their existence, growth, and long preservation of their tribal originality to the climate.

The chief occupation of the Chukchi is reindeer breeding, and consequently their food is almost exclusively reindeer meat. But the Chukchi, like all other people, need vegetables. Where are these to be obtained, then, if they can not grow in the climate of this extreme northeast? In the summer the Chukchi eat the sprouts of many plants, mixing them with reindeer blood, and in winter, as a substitute for vegetable food, they extract the half-digested moss from the stomach of the reindeer and prepare a mash-like green substance of a disagreeable odor, color, and taste. This is called "monyals" (in the local language, "pilkapil"). Some of the Chukchi are very fond of this strange dish, but in most cases it is prepared only in times of need.

Even the religious beliefs of the people in the Russian Far East are connected with the climate. Rocks and trees, mountains and clouds, the elements of wind, rain, thunder, etc., are supposed to be living creatures. All these things, animate and inanimate, may be enemies or friends of man, hence the need to obtain the good disposition of the most powerful, to consider them as good gods, and to insure for themselves their defense against others, the evil gods. Here may be found the beginnings of primitive religion, in the creation of which a large part is played by the climatic conditions, the influence of which, whether injurious or beneficial, is very evident in the case of the primitive population.

Now we shall pass to the very important question of the relation of the climate to the health of the population. Here, for the time being, we shall limit ourselves to only a general discussion, based chiefly on the observations of explorers and inhabitants, and in another paper we shall summarize the whole matter with statistical data. The long and severely cold winter is common to the largest part of the Russian Far East. The winter cold, according to the conclusions of Professor Ellsworth Huntington, which are based upon extensive data, is the most trying element in the climate of the northern United States. It is also the one whose effect can most easily be mitigated, however, provided proper attention is paid not only to temperature, but to atmospheric moisture within doors. This is certainly an undeniable truth, especially if the cold increases and decreases gradually, without sharp jumps or drops; if the winter weather is clear and calm; and if the air is pure and sufficiently humid. In this respect Amur is probably the most healthful region, as all these conditions prevail during the winter; and the least healthful, perhaps, is the Okhotsk region, because of the excess of cloudiness and winds. In the northern parts of the Russian Far East the prolonged dark-

ness, as well as the low temperature, appear to make the winters extremely trying. The summers are also not equally healthful everywhere. The great number of fogs and the exceeding cloudiness along the coast probably cause depression, and thus affect the physical condition and energy of man. Besides, it has been noticed in the Amur and Maritime provinces that the hot days decrease the appetite, the digestion is weakened and disordered, and the skin perspires very much and becomes withered. From a sanitary standpoint, the hot and humid climate influences the growth of different micro-organisms, which often get into the drink and food and cause diseases of the intestinal system, which are particularly injurious to children. The autumn of the Amur and Maritime provinces is warm, calm, and moderately humid, without fogs or frequent rains, and must therefore be considered the most healthful season. In general, considering all the climatic elements, the most healthful locality appears to be the southern sub-region of the Ussuri region, which belongs to the Maritime Province.

Of the diseases observed by physicians, the most frequent are those of the lungs, which have generally the nature of colds. It would be erroneous, however, to ascribe these to the climate. As a matter of fact, we find low temperature accompanied by winds everywhere during the winter. Local habits and conditions of living have much to do with the health conditions. In the houses it is unbearably warm, and the air is extremely dry, and thereby diseases of the respiratory organs, as well as other diseases, are promoted. Moreover, the inhabitants must often come outdoors for various purposes. The difference between the temperature of the yard and that of the houses often exceeds 50° C. Such a condition naturally leads to the contraction of colds. This is proved, furthermore, by the fact that colds are frequent among the settlers and very rare among the natives. The clothing of the settlers is often not in accordance with the needs of the season, and the food during the winter is not sufficient for the greater part of the population. That is why the number of diseases and deaths increases in the winter. In Verkhoyansk, for example, seven tenths of the deaths of the entire year occur during the winter. In some parts of Siberia there are also very frequent cases of malaria, but in the northern and eastern parts of the Russian Far East fever is almost unknown, and in others it is very rare. This fact is in close relation with summer temperature. It has long been considered that the mean isotherm of 60° F. (15.5° C.) in the Northern Hemisphere is the boundary of endemic malaria, and it has also been found that for the development of malarial infection this mean temperature is necessary over at least 16 days. In the northern part of the Russian Far East malaria is unknown because this temperature of 60° F. never lasts over 16 days. This is also explained by the fact that on the Okhotsk shore in Kamchatka and in the Chukotsk-Anadyr region the vegetation is not so rich and in some places is very scanty, offering no shelter to mosquitoes and other insects. The chief form of vege-

tation, the tundra, freezes, and there are consequently no conditions favorable to the development of fever. In the Maritime Province, too, in spite of the abundance of mosquitoes and favorable temperature for development of malarial infection, malaria is almost unknown because of the deep freezing of the soil, which kills the pests.

Next in frequency are the diseases of the stomach, which are common in summer, particularly in the Amur and Maritime provinces, and especially among children. This disease is caused by the food, which must often be eaten unripe. The difference between the temperatures of the day and the night also affect the stomach and the intestinal parts. In the northern and northeastern portions of the Russian Far East also stomach diseases are frequent, but they occur mostly in the winter time. In these sections this form of disease is found to be in direct connection with the condition of the food and its methods of preparation. The trouble begins with the use of the fat animal food, which is badly salted and insufficiently dried. As a result of eating it, there develop a catarrh of the stomach and special kinds of stomach sores, as well as inflammation of the peritoneum and other disorganizations of the digestive system. It should be added, however, that the climate preconditions the kind of food and the methods of its preparation, and the climate must therefore be considered the indirect cause of these diseases. Rheumatism is found everywhere in the Russian Far East. In the eastern parts it appears as the result of the cold and humidity, common in winter, autumn, and spring. In other localities it seems to result from local conditions—the agricultural activities of the autumn, winter, and spring, and the hunting and fishing. Diseases of the eyes are very frequent in the north and northeast. They seem to be due chiefly to two causes. The first is the blinding white snow cover, which is particularly irritating in the spring, when the sun shines on it brightly. The aborigines use hand-made spectacles as a protection against the snow, but they are so badly made that they offer almost no help at all. The other cause is the smoke that abounds in the house, in connection with the usual uncleanness of household life. The climate, therefore, influences these diseases only indirectly. But whatever the causes, they are so serious that at times they bring about the entire loss of sight. They are spread so rapidly that the physicians are often helpless to give any medical assistance. Moreover, the diseases entail very serious consequences to the population in general, because in the case of the illness of the head of a family, he is not able to earn a living for those dependent on him, and this leads frequently to the perishing of the whole family.

Psychic and nervous disorders occupy a prominent place among the diseases of the Okhotsk-Kamchatka region. They are often marked by very peculiar phenomena. The first symptom appears to be a severe headache, from which the patient suffers exceedingly. When a man is afflicted with such disorders, he may run into the forest, or jump wildly over the tundra,

or even climb the mountains. Not finding peace of mind, he frequently attempts suicide. Often the patient screams and howls, talks nonsense, throws and breaks things, and sometimes faints. Hysterical diseases are very common in the Okhotsk region, as a rule, and at times acquire an epidemic character. Doctor Slunin tells us that he often observed such cases. In a quiet company of people one member would begin to scream, others would take it up, and soon the whole house would be filled with cries and screams. Those affected suffer cramps and convulsions and undergo fainting spells, and soon the floor is a mass of crawling, distracted creatures. Cases of insanity are also common, particularly among the newcomers.

We do not know the exact connection or relation between these diseases and the climate, but the writer thinks that the cause lies in the monotony of the long winter, the absence of bright sunny days, and the general disposition toward depression which these conditions bring about. All of these conditions undoubtedly influence the minds of the people, depressing them and inducing nervous disorders. Women are more subject to such diseases than are men, because they have more impressionable natures, and are more subject to their surroundings.

In the Yakutsk Province leprosy is found in a very distressing form, causing panic and fright among the aborigines. This disease is also found in Okhotsk and Kamchatka, and occasionally in other regions. It has probably very little connection with the climate, because it is found in all climates and on all soils. Scurvy was quite widely spread throughout the Russian Far East some time ago, but, as in the case of leprosy, the connection between the disease and the climate is very slight. Influenza, however, is a very frequent disease, and, according to Professor Huntington, is undoubtedly connected with the climate. It affects aborigines, even, especially in the extreme north-eastern parts. Of other diseases, such as typhus, measles, syphilis, etc., we shall not speak here, for they show, at least in the Russian Far East, less connection with the climate than with the social and economic conditions.

The study of the climate in relation to the health of the population is a very complex matter and presents many problems which are hardly capable of being solved. The meteorological records are not sufficiently long and continuous, and the statistical material in regard to the diseases and mortality are not exact. This lack of sufficient data is felt particularly in the case of the aborigines, because no class of people is closer to nature, more completely in its power, and suffers more severely from its destructive influences than do those who remain in the most primitive state of civilization. For this reason, we have given only a general account of the health conditions of the Russian Far East, basing our statements solely on the observations and experiences of explorers and inhabitants.

Unfortunately there is no exact statistical data at my disposal relating to the mortality in the Russian Far East by months, but the following table can serve as an excellent illustration of Yakutsk Province:

January	665 persons	July	345 persons
February	610 "	August	229 "
March	1,049 "	September	359 "
April	578 "	October	417 "
May	485 "	November	454 "
June	822 "	December	499 "

From the above table we can see that the highest mortality is in March and June, constituting almost 29 percent of the total number of deaths which occurred during the entire year. In the rest of the months the percentage of mortality gradually decreases and reaches its minimum in August. This fully confirms all of our conclusions mentioned above.

The striking number of deaths for June can be explained by the fact that in the summer time there is observed in the Russian Far East, in Yakutsk Province, and in general all through Siberia, a considerable mortality amongst children which is due to an epidemic of intestinal diseases, to which children are particularly susceptible. And in general the number of deaths is the largest among children up to one year, as, for instance, in Yakutsk Province in 1890, nineteen percent of the entire number of deaths was that of children at the age of one year.

The influence of the climate on health might best be illustrated by giving statistics on the death rate compared with the variability and present conditions of the climate. But such a comparison is impossible with the data which we now have. We are limited, therefore, once again to general information. The statistics on the death rate are as follows:

	Births per 1000 persons	Deaths per 1000 persons	Natural growth of population
European Russia.....	48	34	13
Amur and Maritime provinces.....	50-60	25-30	25-30

It appears, then, that the mortality in the Russian Far East is less than that in European Russia. But it is probable that the figures given above are too small, especially for the tundra of the Russian Far East, where no authentic census has ever been taken. If we consider that sanitary and hygienic conditions in the Russian Far East are worse than can be imagined in England and America, and that conditions are particularly bad among the settlers, then we shall have to attribute the low mortality to the healthfulness of the climate. The mortality is especially high in the case of children. Of 100 deaths in the Amur Province, 74 occur among children below the age of five. In the Ussuri region the mortality among children of the same age amounts to 66. Two causes may be assigned to this: (1) the poor sanitary and hygienic conditions, which affect children especially severely; and (2) the variability of the climate. The mortality is probably also due to some extent to direct climatic influences. One other fact should be noted in this

connection, namely, that together with the great mortality among children, a very high death rate is also observed at other ages in the case of newcomers. For example, among the native inhabitants the death rate per 1,000 inhabitants is only 22, while among the settlers the number reaches 31. Such a condition is to be attributed not so much to the climate itself as to the marked change in moving from one climate to another. The new settlers, not being acquainted with the peculiarities of the climate into which they have come, and not knowing how to adapt themselves to the new conditions, readily become their prey.

SUMMARY

The climate of the Russian Far East affects all branches of the economic life and activity of the population. If we divide the Russian Far East into separate economic regions, it will be seen that they fully coincide with the climatic provinces and determine not only the present economic conditions, but the future possibilities as well.

Fishing is one of the principal occupations in the northeastern part of the Russian Far East. The climate influences this activity, not only affecting the catch, but the drying of the fish. The climate factors are: dampness, large number of cloudy days, fogs, long winter, freezing of the harbors, strong winds.

Cattle and Animal Breeding.—In the region of the Chukchi, reindeer breeding is the chief occupation. Among the unfavorable effects of climate are: severe and snowy winters, very hot summers. Cattle breeding in the Amur Province is hampered by the following climatic conditions: heavy summer rains and lack of sunshine, with consequent dearth of nourishing herbs. In the Maritime provinces mild climate and oceanic winds, the latter driving away mosquitoes, are among the favorable climatic conditions.

Hunting.—Among the indirect climatic influences the character of vegetation which is determined by climate must be marked. The direct influences are: species of animals and quality of furs, severity of climate, formation of ice crust, sleet, storms, etc., affecting the migration of animals.

Agriculture.—In the Okhotsk, Kamchatka, Chukotsk regions sharp oscillations of temperature, humidity, fogs, etc., preclude the possibility of agriculture. In the Ussuri and Amur provinces, where climate is milder, agriculture is considerably developed, permitting even the cultivation of rice.

Customs, houses, and food, especially the latter, are affected by climate. In agricultural regions bread is the chief food; fish and meat, on the other hand, constitute the chief food where fishing and hunting predominate. Among the Chukchi reindeer constitute almost the only food.

The effect of climate upon religious beliefs is seen from the worship of rocks, trees, mountains, elements of wind, rain, thunder, etc.

Health.—The long and severely cold winter which is common over the

largest part of the Russian Far East is most trying upon the population. The healthiest region is Ussuri. Okhotsk is the least healthful because of the excess of cloudiness and winds. In the northern parts of the Russian Far East the prolonged darkness, as well as the low temperature, are very trying, and in summer fogs and exceeding cloudiness along the coast depress and affect the population. The hot days decrease the appetite and affect the digestive system. Hot and humid climate tends to the development of micro-organisms.

Diseases.—Lung diseases are especially common throughout the Russian Far East, and occur especially in winter. In the Amur and Maritime provinces diseases of stomach, as a result of unripe food, also of the difference between the temperature of the day and night, are common. An indirect climatic cause of diseases is food, as, for example, badly salted animal fat, which causes internal catarrh. In the eastern parts of the Russian Far East humidity accounts for rheumatism. Diseases of eyes, often resulting in total blindness, are very frequent in the north and northeast, and are due to the dazzling cover of snow and to smoke indoors. In the Okhotsk-Kamchatka region psychic and nervous disorders are prominent and occur as a result of the long monotonous winter and absence of bright sunny days.